

Applicant thanks the Examiner for the careful reading of this application, for pointing out discrepancies, and for providing suggestions.

Applicant thanks the Examiner for indicating allowable subject matter.

The disclosure has been objected to because page 2 lines 16 - 17 refers to the claims. Applicant has reviewed the original English translation of the specification, and the substitute specification filed with the Preliminary Amendment. Applicant notes that while the original translation of the specification has a reference to the claims, the substitute specification does not appear to have a reference to the claims. Applicant note that the marked-up copy of the substitute specification shows that the reference to the claims has been removed.

Claims 21, 22 and 23 have been rejected as being anticipated by JP 1-243554.

Claim 21 has been amended to set forth that the step of applying laser energy uses a swiveling mirror and a laser device. In the embodiment of present Fig. 1, the swiveling mirror is represented by reference 33. This is also described in the substitute specification on page 12 line 21 - page 13 line 20. Applicant has reviewed '554, and finds no teaching nor suggestion of a swiveling mirror and a laser device applying laser energy. Amended claim 21, and its dependent claims, therefore cannot be anticipated by '554.

In '554, a laser irradiation mechanism 12 is positioned directly above the openings 8, as described in the English abstract. To irradiate the balls 11, the laser mechanism 12 and the balls 11 have to be moved relative to each other. The present invention avoids this problem. With the present invention, instead of moving a relatively large and heavy laser device or template/substrate combination, a swiveling mirror can be much easier to move. The present

invention therefore overcomes problems which occur due to trying to move a heavy laser device, or a template/substrate combination.

Claim 21 has also been rejected as being obvious over DE 197 39 481 in view of JP 1-243554.

Applicant notes that reference DE '481 has a publication date of October 15, 1998. The present invention has a priority date of August 25, 1998. Since Applicant's priority date is before the publication date of the German reference '481, German reference '481 is not prior art to the present application. If the Examiner desires, a sworn translation of the Priority Document can be provided. German reference DE '481 has been mentioned in the Information Disclosure Statement because it was cited in the International Search Report. However, even though this reference may be considered significant according to PCT International regulations, this reference is not prior art according to U.S. patent regulations.

Even if DE '481 is prior art, Applicant notes that this reference does not describe the step of applying laser energy using a swiveling mirror and a laser device. As described previously, JP '554 also does not describe the step of applying laser energy with a swiveling mirror and a laser device. Therefore the combination of DE '481 and JP '554 therefore fail to anticipate all of the features of amended claim 21. Amended claim 21 therefore defines over this combination of prior art.

Claim 21 has also been rejected as being obvious over DE '481 in view of Sakemi.

As described above, DE '481 is not prior art, and does not describe the step of applying laser energy using a swiveling mirror and a laser device. Applicant has also reviewed Sakemi,

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Even if DE '481 is prior art, Applicant notes that this reference does not describe the step of applying laser energy using a swiveling mirror and a laser device. As described previously, JP '554 also does not describe the step of applying laser energy with a swiveling mirror and a laser device. Therefore the combination of DE '481 and JP '554 therefore fail to anticipate all of the features of amended claim 21. Amended claim 21 therefore defines over this combination of prior art.

Claim 21 has also been rejected as being obvious over DE '481 in view of Sakemi.

As described above, DE '481 is not prior art, and does not describe the step of applying laser energy using a swiveling mirror and a laser device. Applicant has also reviewed Sakemi,

and also finds that the use of a swiveling mirror and a laser device are not disclosed. Applicant's review of Sakemi does find that Sakemi describes soldering balls 3 being heated and melted in a reflow step. However there is no indication of applying laser energy, and especially using a swiveling mirror and a laser device. Therefore the combination of DE '481 and Sakemi, fail to anticipate all of the features of claim 21. Claim 21 therefore cannot be obvious over the combination of these references.

New claim 43 sets forth the further step of swiveling the swiveling mirror to direct laser energy from the laser device to a plurality of the template apertures. In the embodiment of present Fig. 1, the template apertures are represented by reference 27. Applicant has reviewed the prior art, and finds no teaching nor suggestion of this step in the prior art.

Applicant notes that the reference of Azdasht '512 has been applied to the claims in the present application. Applicant has reviewed this reference, and notes that this reference also does not teach nor suggest applying laser energy through a swiveling mirror, and especially does not teach nor suggest the step of swiveling the swiveling mirror to direct laser energy to a plurality of template apertures. Claim 43 therefore further defines over the prior art.

Claims 24 and 25 have been rejected as being obvious over JP '554 and further in view of Azdasht '512.

Claim 24 sets forth the step of scanning of the template apertures using an optical scanning device. Applicant has reviewed Azdasht '512, and notes that Azdasht describes sensors such as elements 150, 152 and 154. However, neither of these sensors are used in a step of scanning. Applicant notes that the step of scanning involves scanning a plurality of

objects in a single action, generating a plurality of signals from the sensor, and then coordinating the object with the corresponding signal in order to determine a property of the object. Applicant finds no teaching nor suggestion in Azdasht '512 of coordinating the scanning of a plurality of objects with a plurality of generated signals to match the object with its corresponding signal. Therefore it is Applicant's position that Azdasht does not describe the step of scanning. Claims 24 and 25 therefore define over the combination of '554 and Azdasht '512.

Claims 24 and 25 have also been rejected as being obvious over DE '481 in view of JP '554 and further in view of Azdasht '512. As described above, Azdasht does not describe the step of scanning. Applicant also notes that DE '481 is not prior art. DE '481 and JP '554 also do not teach nor suggest the step of scanning. Therefore claims 24 and 25 also define over this combination of the prior art.

Claims 24 and 25 have also been rejected as being obvious over DE '481 in view of Sakemi and further in view of Azdasht '512. It is Applicant's position that claims 24 and 25 also define over this combination of the prior art for the same reasons as the previous combinations.

Independent claim 30 has been rejected as being obvious over DE '481 in view of Sakemi.

Claim 30 has been amended to set forth that the container comprises a transparent rear wall. In the embodiment of Fig. 1, this rear wall is represented by reference 25. Even if DE '481 is considered prior art, Applicant notes that DE '481 does not disclose a template device

which has a transparent rear wall.

Claim 35 has also been rejected as being obvious over DE '481 in view of Sakemi. Claim 35 also sets forth a transparent rear wall. A rejection does not indicate what structure in DE '481 is equated with the transparent rear wall of the present invention. Applicant has reviewed DE '481, and notes that this reference describes an element 16 arranged opposite a ball holding element 10. Applicant's review of DE '481 finds no teaching nor suggestion that element 16 is transparent. Applicant notes that this element 16 is therefore not similar to the transparent rear wall of claims 30 and 35.

Applicant also notes that DE '481 describes optical fibers 22. However a person or ordinary skill in the art would not equate optical fibers as being the same as a rear wall.

Applicant notes that the plurality of optical fibers in DE '481 has disadvantages, in that many optical fibers are required and laser energy would then need to be guided into each single optical fiber. If the number of optical fibers is low, the effort to connect each optical fiber to laser energy is acceptable. However when the number of solder connections and optical fibers increases drastically, the effort to connect can become excessive. The transparent rear wall of the present invention, especially in combination with a swiveling mirror overcomes this problem of connecting a plurality of optical fibers to a source of laser energy.

Applicant has also reviewed Sakemi, and finds no teaching nor suggestion of a transparent wall in Sakemi. Therefore the combination of DE '481 and Sakemi fail to anticipate all of the features of amended claim 30, and original claim 35. These claims therefore cannot be obvious over the combination of the prior art.

With this Amendment, Applicant has added new claims 41 and 42 which depend from claims 35 and 30 respectively. These claims set forth that the transparent rear wall has a transparent portion that exposes a plurality of the template apertures to laser radiation. As one can see in the embodiment of present Fig. 1, element 25 has a large transparent portion which exposes a plurality of the template apertures 27 to laser radiation. Applicant has reviewed DE '481 and Sakemi, and finds no teaching nor suggestion of any transparent portion which exposes a plurality of template apertures to laser radiation. Claims 41 and 42 therefore further define over the prior art.

Claim 35 has also been rejected as being obvious over DE '481 in view of JP '554. As stated above, DE '481 does not teach nor suggest a transparent rear wall. Applicant has reviewed JP '554 and also finds no teaching nor suggestion of a transparent rear wall. Therefore the combination of DE '481 and JP '554 fail to anticipate all of the features of claim 35. Claim 35 therefore cannot be considered obvious in view of DE '481 and JP '554.

Claims 41 and 42 also define over DE '481 and JP '554 for the same reasons as in the previous rejection.

Applicant again thanks the Examiner for indicating allowable subject matter. If the Examiner has any comments or suggestions which would further favorable prosecution of this application, the Examiner is invited to contact Applicant's representative by telephone to discuss possible changes.

At this time Applicant respectfully requests reconsideration of this application, and based on the above amendments and remarks, respectfully solicits allowance of this application.

Respectfully submitted
for Applicant,

By: 

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70091.16

Enclosed: Marked-Up Paragraphs from the Specification
Marked-Up Version of the Claims
Request to Charge Deposit Account (for 3 claims in excess of 20)
Petition for One Month Extension of Time

DATED: June 24, 2003
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SHOULD ANY OTHER FEE BE REQUIRED, THE PATENT AND TRADEMARK OFFICE IS HEREBY REQUESTED TO CHARGE SUCH FEE TO OUR DEPOSIT ACCOUNT 13-0410.

MARKED-UP PARAGRAPHS FROM THE SPECIFICATION

Pages 13 - 14, paragraph starting on page 13 at line 21 and ending on page 14 at line 6:

Fig. 2 shows a template device 40 which, analogous to the template device 21 shown in Fig. 1, comprises an aperture screen 41, a transparent rear wall 42, a sidewall frame 43 and a pressure connection 44. Located in an interior space 45 is a filling chamber 47 which in the present example comprises four sidewall segments 46 and which in the present case is delimited at the top and bottom by the rear wall 42 and by the aperture screen 41 respectively. Arranged in the filling chamber 47 is a multitude of shaped parts of solder material 20 which are used to fill template apertures 48 in the aperture screen 41.

Page 18, paragraph starting at line 1 and ending at line 7:

Fig. 14 is a top view of an aperture screen 74 of a template device 75 which comprises a multitude of template segments 76. The template device 75 comprises a filling chamber 47 whose function and design have already been described. The sectional view of the filling chamber 47 according to Fig. 15 shows that the sidewall segments 46 of the filling chamber 47 to across the area of the aperture screen 74 are of a multilayer wall construction. Between two outer surface layers 77 and 78 made of metal so as to be wear resistant, there is a compression layer 79 made of a non rigid plastic material, for example polyamide.

Page 18, paragraph starting at line 13 and ending at line 20:

The combined effect of sidewall segment 46 designed in this way, of the filling chamber 47, and of the aperture screen 74, is a deformation ability as for example shown in Fig. 3. The wall design of the aperture screen 41 shown in Fig. 3 is identical to that of the aperture screen 74. Fig. 3 shows that as a result of such wall design, even major surface curvatures or instances of deformation of the substrate can be compensated for. Consequently, any impediments when carrying out the method for placing and re-melting a multitude of shaped parts of solder material on bond pads of a substrate by means of different variants and embodiments, can to a very large extent be prevented.

MARKED-UP VERSION OF THE CLAIMS

21. (Amended) A method for placing a multitude of shaped parts of solder material on a bond pad arrangement of a substrate, said bond pad arrangement comprising a multitude of bond pads, and for subsequent re-melting of the shaped parts of solder material on the bond pads, method comprising the steps of:

arranging a template device, comprising a multitude of template apertures for accommodating shaped parts of solder material opposite a substrate comprising a bond pad arrangement, such that the shaped parts of solder material are associated with the individual bond pads;

applying laser energy to the shaped parts of solder material accommodated in the template apertures using a swivelling mirror and a laser device arranged at the rear of the template device such that said laser energy is applied to the shaped parts of solder material through the template device.

22. (Amended) The method according to claim 21, further comprising the steps of:

selecting shaped parts of solder material from the bulk of shaped parts of solder material accommodated in the template device wherein by filling the template apertures arranged in an aperture screen.

30. (Amended) A device for placing a multitude of shaped parts of solder material on a bond pad arrangement of a substrate, said bond pad arrangement comprising a multitude of bond pads, and for subsequent re-melting of the shaped parts of solder material on the bond pads, the device comprising:

5 a template device with a container for accommodating a quantity of shaped parts of solder material, said container comprising a transparent rear wall and a container wall forming an aperture screen; for conveying shaped parts of solder material to the bond pad arrangement, the aperture screen comprising a selecting device such that shaped parts of solder material which have been singled out from the quantity of shaped parts of solder material and allocated
10 to individual bond pads of the bond pad arrangement, are arranged so as to be exposed, in template apertures of the aperture screen, and thus can be exposed to laser energy from the rearside of the template device which is turned away from the substrate by means of a laser device.

38. (Amended) The device according to ~~one or several~~ of claim 30, wherein, one or both of the wall structure of the aperture screen and the sidewall of the filling chamber, which can be moved over the aperture screen, is flexible across the area of the aperture screen.